REMARKS/ARGUMENTS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-7 are presently pending in this application, Claims 2-5 having been withdrawn from further consideration by the Examiner, Claims 1 and 6 having been amended, and Claim 7 having been newly added by the present amendment.

In the outstanding Office Action, Claims 1 and 6 were rejected under 35 U.S.C. §102(b) as being anticipated by Luthra et al. (U.S. Patent 5,962,103); and Claims 1 and 6 were rejected under 35 U.S.C. §102(b) as being anticipated by Hanzawa (U.S. Patent 5,851,941).

Claims 1 and 6 have been amended and Claim 7 has been added herein. These amendments and addition in the claims are believed to find clear support in the original disclosure of the present application, for example, the specification, page 9, lines 15-22. Thus, no new matter is believed to be added thereby.

Briefly, Claim 1 as currently amended is directed to a silicon carbide-based, porous, heat-resistant structural material produced by a process including the steps of preparing a porous structural body comprising a corrugated cardboard material and having a framework, infiltrating a slurry containing powdered silicon and a carbon source comprising a resin into the porous structural body, firing the porous structural body in an evacuated or an inert atmosphere such that the corrugated cardboard material is decomposed to form a carbonized composite having the framework, performing reaction-bonding so as to form silicon carbide having sufficient molten silicon wettability such that molten silicon penetrates into the porous structural body and to simultaneously form open pores by the reaction-bonding which decreases a volume of the porous structural body, and infiltrating molten silicon into the open

pores of the porous structural body so as to form a composite of silicon carbide and silicon having the framework of the porous structural body. By forming the composite of silicon carbide and silicon through these steps, the composite thus made substantially retains the framework of a corrugated cardboard material, and therefore has a significantly higher porosity, *e.g.*, 90% or more. As a result, a more lightweight, heat-resistant structural material which can be readily formed into complicated shapes can be obtained.[1]

The outstanding Office Action asserts that Claim 1 is anticipated by Luthra et al. or Hanzawa because "[t]he claimed product comprises a porous product containing silicon carbide as indicated by the preamble and the claim language "performing reaction-bonding of the porous structural body so as to form silicon carbide ... and to simultaneously form open pores caused by the reaction-bonding during which the reaction volume decreases" and silicon indicated by the claims language "to form a composite of silicon carbide and silicon having the porous structural body," and also because "[t]he remaining process limitations are not considered to imbue the claim with any further structure." However, in assessing the patentability of a product-by-process claim, MPEP §2113 states:

> **The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially** where the product can only be defined by the process steps by which the product is made, or **where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product**. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (emphasis added)

And it is respectfully submitted that neither Luthra et al. nor Hanzawa teaches or suggests the composite of silicon carbide and silicon having the structural characteristics imparted by the steps recited in amended Claim 1. Specifically, according to amended Claim 1, a porous

[1] Specification, page 5, lines 8-15.

structure body comprised of a corrugated cardboard material and having a framework is prepared and fired to produce the porous structure body having a carbonized composite, and the framework of the corrugated cardboard material is substantially retained in the carbonized composite and in the composite of silicon carbide and silicon. Hence, the silicon carbide/silicon composite has a porosity of a corrugated cardboard material, *e.g.*, 90 % or more, and therefore a more lightweight, heat-resistant structural material with a desired shape can be produced. On the other hand, Luthra et al. is directed to a method of sealing cracks of fiber reinforced SiC matrix composite material, and discusses the problem of cracks produced in silicon carbide-silicon matrix composites which may make the composite brittle. In particular, Luthra et al. states that "[t]he present invention produces a ceramic composite with a porosity of less than about 20% by volume, with the capacity to heal matrix cracks in situ in a silicon carbide-silicon composite matrix."[2] Thus, the Luthra et al. method produces a silicon carbide-silicon composite matrix having the cracks or pores sealed by such a ceramic composite, rather than a composite of silicon carbide and a silicon where the framework and porosity of a corrugated cardboard material is substantially retained. Likewise, Hanzawa shows Si/SiC-based sintered material having a porosity of less than about 0.6% in Fig. 6, and states that "[t]he porosity ... is desirably 0.8% or less. ... in order to achieve the porosity of 0.8%, the metal Si must be added in an amount at least 1.05 times the theoretical amount. ... When the metal Si is added in an amount less than 1.05 times, impregnation with Si is insufficient and the resulting sintered material has a larger porosity and has lower oxidation resistance."[3] As such, Hanzawa merely teaches Si/SiC-based sintered material having a lower porosity than the claimed composite of silicon carbide and a silicon. Therefore, the

[2] Luthra et al., column 3, lines 7-19 and column 5, lines 1-4.
[3] Hanzawa, column 6, lines 24-38.

material recited in Claim 1 is believed to be distinguishable from both Luthra et al. and Hanzawa, and thus allowable.

Independent Claim 6 as currently amended is directed to a silicon carbide-based, porous, heat-resistant structural material including a composite of silicon carbide and silicon produced by a process including the steps of preparing a porous structural body comprising a decomposable porous material and having a framework, infiltrating a slurry containing powdered silicon and a carbon source into the porous structural body, firing the porous structural body in an evacuated or an inert atmosphere such that the decomposable porous material is decomposed to form a carbonized composite having the framework, performing reaction-bonding so as to form silicon carbide having sufficient molten silicon wettability such that molten silicon penetrates into the porous structural body and to form open pores by the reaction-bonding which decreases a volume of the porous structural body, and infiltrating molten silicon into the open pores of the porous structural body so as to form the composite of silicon carbide and silicon having the framework of the porous structural body. Accordingly, substantially the same arguments as set forth above for Claim 1 are believed to be applicable to Claim 6 and its dependent Claim 7. Therefore, Claims 6 and 7 are also believed to be distinguishable from both Luthra et al. and Hanzawa, and allowable.

In view of the amendments and discussions presented above, Applicant respectfully submits that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

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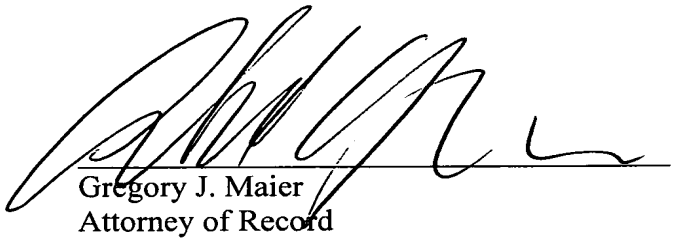

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